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HB 560

**Testimony to**  
**Montana House Natural Resources Committee**  
**in Opposition to**  
**House Bill No. 560**  
**David C. Sanders, Ph.D.**

**16 February 2007**

Chairman McNutt and members of the Natural Resources Committee, thank you for the opportunity to present testimony in opposition to HB560. I would be happy to meet with you in person in Montana, at your convenience, because nothing is more important to the members of the Bromine Science and Environmental Forum (BSEF) than helping ensure that legislators and others developing public policy have factual, scientific information on which to base important decisions.

My name is David Sanders and I am submitting this testimony in my capacity as member of the Management Committee of BSEF, which is a scientific organization comprised of the primary world producers of brominated flame retardants. I am also Director of Environmental Advocacy for Chemtura Corporation, a manufacturer of a variety of flame retardants and one of the BSEF member companies. I am a chemist by academic training and degree and have worked in the chemical and flame retardant industry for my entire career.

Flame retardants, or ignition resistance materials, help prevent fires from starting and slow the rate of growth of fires that do start. They are widely used in electronics, electrical appliances, furniture, fabrics and all forms of public transportation. As such, flame retardants allow longer escape times for those in the presence of a fire, as well as longer response times and less advanced fires for firefighters. It is estimated that escape times can be up to 15 times longer when flame retardants are present, providing increased survival chances for those in close proximity. A recent study by the University of Surrey estimates that flame retardants have been responsible for a 20 percent reduction in fire deaths in the United Kingdom in recent years.

When flame retardants are not present, as was the case in the tragic 2003 Rhode Island Station nightclub fire in which 100 people died during a fire involving foam insulation that was not flame-retarded, rapid ignition and fire spread can lead to significant loss of life and property. Conversely, when an Air France jet skidded off the runway in Toronto in 2005 and burst into flames, the flame retardant materials used in airplane construction were credited with providing the extended escape time needed for all 309 passengers and crew to escape.

Brominated flame retardants (BFRs) are commonly used in commercial products to increase their resistance to fire. Bromine, like chlorine, fluorine and iodine, is one of the elements in the chemical group known as "halogens." Bromine is abundant in nature as bromide salts or as organobromine compounds, which are produced by many types of marine organisms. Polybrominated diphenyl ethers (PBDEs) represent one particular family of BFRs. There are three commercial PBDE products (Octa-BDE, Penta-

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BDE and Deca-BDE) and the three products differ in their composition, uses, manufactured volume, toxicology, and environmental distribution. Of the three PBDEs, only Decabromodiphenyl ether (Deca-BDE) remains in widespread commercial use.

Deca-BDE is a brominated flame retardant used in a variety of consumer electronic and electrical appliances, including television housings and wire and cable insulation, as well as in some textiles, because of its compatibility with those materials and its effectiveness in preventing fires. Deca-BDE is a white crystalline powder that is mixed into raw plastics to form a consistent, flame-retarded material. This flame-retarded plastic is then used in the manufacture of flame retardant plastic components, such as television set housings, wire and cable insulation, electrical connectors, etc. In textile applications, Deca-BDE is typically used in a water-based system which is customized for the textile being treated. After the water-based product has been applied, the textile goes through a drying process, during which Deca-BDE is physically locked into a "polymer matrix" and bound to the textile.

BSEF opposes HB560 because it rests on the erroneous presumption that decabromodiphenyl ether (Deca-BDE) is a harmful material that should be banned in favor of lesser-known alternatives. This presumption is not supported by science – Deca has been rigorously tested in the United States and Europe and found to be safe for continued use from the human health and environmental perspectives. In fact, Deca is the most studied flame retardant in history, including a 10-year-long risk assessment conducted by the European Union that examined 588 studies covering a wide range of potential human health and environmental concerns. That extensive study did not identify any human health or environmental risks in need of further regulation and concluded that Deca-BDE is safe for continued use. That conclusion led directly to the decision by the European Commission to exempt Deca-BDE from its Regulation of Hazardous Substances Directive (RoHS) in October 2005.

Other independent studies also confirm that Deca-BDE can be used in consumer products without concerns for health, including the U.S. National Academy of Sciences Review of DBDPO (Deca-BDE), the Consumer Product Safety Commission (CPSC) DBDPO Risk Assessment, the U.K. Department of Trade and Industry: Risks and Benefits in the Use of Flame Retardants, and the California Senate Office of Research report on PBDEs, among others.

In February of 2006, Hawaii's Department of Health testified against a ban of Deca and in support of further study, stating that there is "uncertainty related to the toxicity of deca-BDE" and noting that, "there are currently no viable alternatives to Decabromodiphenylether (Deca-BDE) in the marketplace."

Less than two months ago, the Maryland Department of the Environment finalized a comprehensive review of Deca-BDE. The Department concluded that Deca-BDE should not be banned unless safer alternatives are identified, and/or new toxicological data shows that there is an unacceptable risk to public health and/or the environment" and noted:

- The risk of alternatives that would provide equivalent fire safety have not been established;
- The particular substance has been found to be relatively safe: and
- The conditions under which the substance breaks down in the environment and whether the breakdown products are more toxic is still being studied.



I would like to take a moment to respond to a few statements in the proposed bill language. The preamble to HB560 enumerates a litany of potential health effects attributed to polybrominated diphenyl ether. It is important to recognize that not all polybrominated diphenyl ethers (PBDEs) are the same, despite the tendency of activists and others to group all PBDEs together and refer to them as a single chemical. In fact, Deca-BDE is a chemically and structurally distinct chemical and, as such, should not be subject to a one-size-fits-all regulatory approach.

With regard to the assertion that Deca "levels of polybrominated diphenyl ethers are increasing in people and in the environment" and "people can be exposed to these chemicals through house dust and indoor air, as well as through food," it should be noted that Deca is being detected at extremely low levels. In practical terms, based on levels of Deca reported in recent studies, if a 150-pound person ate more than 400 pounds of household dust every day, his/her exposure to Deca still would be below the "reference level" experts have identified as a threshold for potential concern.

HB560 proposes a ban of all polybrominated diphenyl ethers beginning January 1, 2008, with the exception of residential upholstered furniture and television or computer electronic enclosures that contain commercial decabromodiphenyl ether, until and unless the department and the department of public health and human services find that safer and technically feasible alternatives are available, and the fire prevention and investigation advisory council determines that the alternative identified meets applicable fire safety standards. BSEF commends the Committee's recognition of the importance of fire safety. However, there are a number of reasons to be concerned with this approach.

First, Deca is used in a wide range of applications beyond those exempted in this legislation, including wiring and cable and in upholstered furniture in commercial buildings, where Deca protects our seniors in assisted living, businessmen and women in hotel rooms and office buildings, patients in hospitals, and many others. In these applications, as in the applications exempted, Deca-BDE is the most effective flame retardant available. There are no potential alternatives that combine Deca-BDE's technical efficiency with such rigorous evaluation of potential environmental and human health impacts.

Second, in the marketplace, where manufacturers must make product ingredient decisions well in advance of actually making the product, even the threat of a future ban on Deca-BDE may cause manufacturers to make changes in their processes. This will, of necessity, force the high-volume use of the very substances about which the Washington State Departments of Ecology and Health, the Hawaii Department of Health, the Maryland Department of Environmental Protection, as well as environmental organizations, admit they do not know enough about to endorse their use. The potential human health and environmental repercussions of requiring manufacturers and other users of Deca-BDE to abandon a very well-known substance that has been established as safe for continued use in favor of unidentified or lesser-known substances are, at best, unknown.

The threat of a ban also brings the real possibility that the marketplace could abandon flame retardants all together. Between the mid-1980s and the mid-1990s in Europe, the number of TV set fires fell by as much as 50 percent. This trend coincided with improvements in design, manufacture, decreased power consumption and the use of effective flame retardant additives in enclosure materials. In the early 1990s, the anti-halogen stance of some environmentalist groups in Europe saw a number of legislative activities aimed at restricting the use of certain halogenated flame retardants, leading European manufacturers to make television housings with materials that have little or no flame retardancy.

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Statistics for Europe show an annual 325 fires for every million television sets compared with just six per million in the United States. This is due to the fact that televisions in the United States are for the most part fire safe, but this is only voluntarily. If a proven and well-tested flame retardant such as Deca-BDE is banned in Montana, a likely outcome could be the removal of flame retardants altogether, resulting in more fires and more unnecessary injuries or deaths. To substitute Deca-BDE with an "alternative" would be to subject the citizens of Montana to substances which are less-tested and about which less is known in terms of their environmental and human health impact. Alternatively, products such as televisions in which ignition resistance is an important safety feature may not be available to consumers in Montana.

HB560 specifically proposes a ban of the use of Deca-BDE in mattresses in the State of Montana beginning January 1, 2008. This proposal is clearly not based in sound science. In January of 2006, the United States Consumer Product Safety Commission conducted a quantitative risk assessment to provide a more accurate estimate of the potential risk to consumers associated with exposure to flame retardant-treated barriers used by manufacturers to meet US CPSC's open flame mattress flammability standard. CPSC results indicate that there are a number of flame retardant treatments available, including Deca-BDE, that can be used to meet the mattress flammability standard and that "are not expected to pose any appreciable risk of health effects to consumers."

Forcing the replacement of Deca-BDE without an in-depth analysis of the risks and benefits of moving to other flame retardants whose potential impacts on human health and the environment are far less understood is not sound public policy. BSEF member companies are producers of a variety of flame retardants, including alternatives to Deca-BDE. No other flame retardant is as well-known and well-documented as Deca-BDE. Do alternatives to Deca-BDE exist? To some extent. Are they "safer"? The answer is unclear at best. The available alternatives, generally, have had a minimum level of safety studies.

Deca-BDE, on the other hand, is supported by a wealth of data from more than ten years of studies – monitoring, biomonitoring, emissions from downstream users and more, and the results have consistently been that there is no need for risk reduction regarding the use of Deca-BDE. Any substances considered by the department and the department of public health and human services as feasible substitutes to Deca-BDE should be as effective or more effective in terms of enabling high levels of fire safety to be achieved, be easy to formulate in all applications, and have undergone at least the same level of study as Deca and found to have a lower toxicity profile and less environmental impact. Suggesting that Deca-BDE be replaced by substances for which no such data exists rewards products that have very little data. It also carries the very real possibility of reducing fire safety, and potentially of bringing unintended environmental and human health impacts.

Finally, and very importantly, we must recognize the clear necessity of maintaining adequate fire safety. Despite advances in fire safety, technology and building codes, fires still represent a very serious risk. Deaths from fires and burns are the fifth most common cause of unintentional injury deaths in the United States (CDC 2005) and the third leading cause of fatal home injury (Runyan 2004). U.S. fire departments responded to an estimated 1,602,000 fires in 2005. These fires resulted in 3,675 civilian fire fatalities, 17,925 civilian fire injuries and an estimated \$10,672,000,000 in direct property loss. There was a civilian fire death every 143 minutes and a civilian fire injury every 29 minutes in 2005. Home fires caused 3,030, or 82 percent, of the civilian fire deaths (Karter 2006).

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Flame retardants reduce the overall number of fires, and lessen the spread and intensity of those that do occur and, as such, play a critical role in making homes, apartments, hospitals, nursing homes, offices, cars and public transportation safer from the life-threatening consequences of fire. A risk-benefit analysis must take into consideration the very real potential of lowering fire safety by forcing manufacturers to stop using the best, most proven flame retardant available, regardless of the human or environmental consequences.

In closing, let me say that we stand ready to assist the Committee in separating fact from fiction, myth from reality, anecdote from scientific evidence. We believe, and scientific research and analysis supports our belief, that Deca-BDE is a safe, effective and efficient product that saves lives every day and every year. It is clear that banning Deca-BDE has the potential to directly decrease fire safety.

We also urge the Committee to consider very seriously the potential human health and environmental implications of forcing the abandonment of a well-known and extensively studied flame retardant whose safety has been verified in favor of products about which much less is known.

We respectfully suggest that HB560 is not based on a sound appreciation of the science supporting Deca-BDE, and that its implementation would result in reduced levels of fire safety for the citizens of Montana, as well as the potential for unintended human health and environmental consequences. Please remember that if such action is taken, Montana will be the only state in the United States to have done so. For these reasons we urge the Committee to vote against HB560.

I will be very happy to answer any questions that you may have, either in writing or in person.

Sincerely,

A handwritten signature in cursive script, reading "David C. Sanders", is positioned below the word "Sincerely,".

David C. Sanders, Ph.D.,  
Member of the Management Committee  
Bromine Science and Environmental Forum



1110 Vermont Ave., NW  
Suite 1200  
Washington, DC 20005  
T: 202.530.4847 • F: 202.530.4500

## Deca-BDE: Fast Facts

**Fire Safety:** The United States has the third highest overall fire death rate of all industrialized countries, and those whose lives are most at risk are young children, the elderly and fire fighters. The flame retardant Decabromodiphenyl ether (Deca-BDE) is used in a variety of consumer electronic appliances, including television housings and wire and cable insulation, to help prevent fires from starting and to slow the rate of growth of fires that do start. This allows longer escape times for those in the presence of a fire, as well as longer response times and less advanced fires for firefighters.

**Scientific Review and Analysis:** Deca-BDE is the most studied flame retardant in history. In 2004, the European Union completed a 10-year-long Risk Assessment of Deca-BDE, examining a broad range of human health and environmental issues, and determined that Deca-BDE was safe for continued use. In 2005, based on the conclusions of that Risk Assessment, the European Commission exempted Deca-BDE from its Restrictions on Hazardous Substances Used in Electrical and Electronic Applications (RoHS) Directive. Other major studies performed by the **U.S. National Academy of Sciences, the U.S. Consumer Products Commission and the United Kingdom's Department of Trade and Industry** have reached similar conclusions.

**State Actions:** Some states are conducting studies of Deca-BDE beyond those already conducted, but no state or regulatory agency or legislature has taken action against Deca-BDE.

**Alternatives:** While alternatives to Deca-BDE do exist, none of them has been as thoroughly studied and tested. As such, the potential human health and environmental repercussions of requiring manufacturers and other users of Deca-BDE to abandon a well-known product in favor of unidentified or lesser-known substances are, at best, unknown.

**Economic Impact:** The consumer and economic impact of a ban on the use of Deca-BDE in the State of Montana could be extreme. Products that would be affected by restricting use of Deca-BDE include not only household consumer goods such as televisions, electronics and electronic equipment, but also automobiles, trucks, buses, airplanes and boats. Proposed legislation is not likely, however, to prohibit consumers buying such fire-safe goods in another state and bringing them into Montana.

Moreover, manufacturers are not likely to produce goods that are only marketable in Montana, unless such goods can command a premium price. As such, the likely result will be a reduction in available consumer goods in Montana, and a commensurate reduction in sales and tax revenue.

**Conclusion:** Deca-BDE is a highly effective flame retardant with a proven record of preventing or lessening the impact of fires. Significant scientific evidence supports its continued use. Banning the use of Deca-BDE is misguided and would actually result in a decrease in both fire safety and the availability of consumer goods. The fire safety benefits of Deca-BDE far outweigh any potential risks associated with its use, and we strongly urge you not to support any efforts to ban or restrict Deca-BDE and thereby reduce fire safety for the citizens and firefighters of Montana.

February 2007

## Applications of Deca-BDE

### ❖ Electric & Electronic (E&E) equipment

- housings and internal components of TVs
- mobile phones and fax machines
- audio and video equipment
- remote controls
- communications cables
- capacitor films
- building cables
- wire and cables, e.g., heat shrinkable tubes
- connectors in E&E equipment
- circuit breakers
- coils of bobbins
- printing and photocopy machine components - toner cartridges and connectors
- scanner components

### ❖ Ships, boats, airplanes

- electrical wiring and cables
- Electric & Electronic equipment
  - navigation and telecommunications equipment
  - computers and computer devices
  - audio and video equipment
  - electrical connectors
  - appliances
  - housings and internal components of TVs
  - fax machines
  - remote controls
  - communications cables
  - capacitor films
  - cables
  - circuit breakers
  - printing and photocopy machine components - toner cartridges and connectors
  - scanner components
  - air ducts for ventilation systems
  - electrical ducts and fittings
  - switches and connectors
  - components in fans, heating fans and hair dryers

### ❖ Textiles and furniture

- households/furniture appliances
  - upholstery textiles e.g. sofas, offices chairs
  - PU flexible foam
- army tents

### ❖ Automobiles/mass transportation

- fabric (where Deca-BDE is encapsulated in backcoating of article)
  - rear deck
  - upholstery
  - headliner
  - sun visor
  - head rest
  - trim panel
- reinforced plastics
  - instrument panel
  - interior trim
- under the hood or dash
  - terminal /fuse block
  - higher amperage wire & cable jacketing (spark-plug wire)
- Electric & Electronic equipment
  - battery case and battery tray
  - engine control
  - electrical connectors
  - components of radio disk, GPS and computer systems

### ❖ Household

- lamp sockets
- kitchen hoods
- electrical kitchen appliances
- curtains and hanging drapes
- components of water heating device
- components of electrical appliances such as transformers and switches
- components in fans, heating fans and hair dryers

### ❖ Public, private and industrial buildings/construction applications

- pipes
- lamp holders
- stadium seats
- reinforced plastics
- switches and connectors
- facing laminates for insulation panel
- film for use under the roof and to protect building areas
- electrical ducts and fittings
- components in analytical equipment in industrial and medical laboratories
- air ducts for ventilation systems
- pillars for telephone and communication cables



1801 K Street, NW  
Suite 1000-L  
Washington, DC 20006  
T: 202.530.4847 • F: 202.530.4500

## **What the Experts Say**

### **Fire safety and flame retardants**

"Overestimating risks from FRs [flame retardants] might result in a net adverse effect on public health if the uses of FRs that could reduce the risks of death and injury from fires were avoided because of minor toxicological risks estimated through such conservative assumptions."

*Toxicological Risks of Selected Flame-Retardant Chemicals*, National Research Council, National Academy Press, ISBN 0-309-07047-3, 2000, p. 6-7

### **Flame retardants save hundreds of lives by preventing TV fires**

"Based on the in-depth analysis of available statistics conducted as a part of this study, it has been estimated that as many as 160 people may die each year in Europe as a direct result of TV fires and as many as 2000 may be injured in the same period... while there is no documented evidence of death due to the use of flame retardants."

Swedish National Testing and Research Institute. "Fire-LCA Model: TV Case Study," *Interscience*, ISBN 91-7848-811-7 (2000), p. iv and p.138

### **Breast-feeding still best despite environmental chemicals in human milk**

"We strongly emphasize that the mere presence of an environmental chemical in human milk does not indicate that a health risk exists for breast-fed infants...All information gathered to date supports the positive health value of breast-feeding for infants."

Cheston M. Berlin, Jr., M.D., Professor of pediatrics and pharmacology at Penn State Children's Hospital and Director of the Milton S. Hershey Medical Center

### **Environmentalists' opposition to flame retardants could lower fire safety**

"Occurrence of given chemical in the human body is not synonym with a risk or effect, but depends on the concentration-effect relationship and associated lowest observed effect level. This is a basic principle in toxicology!"

Professor Anthony Trewavas, University of Edinburgh. "Effective Retardants," *The Scotsman*, 18 April 2005

### **Levels of Deca-BDE in human blood do not represent a hazard to health**

"The levels of Deca-BDE detected in blood by the WWF study [2003 UK biomonitoring study] are extremely small in comparison to those that might potentially be associated with adverse effects. Given that the Deca-BDE molecule is relatively inert and is dissimilar to chemicals such as hormones that are naturally present in the body, low levels of Deca-BDE in blood would not be expected to represent a hazard to health."

*Institute of Occupational Medicine (IOM)*

### **Lowest imaginable concentrations measured, but no need to panic**

"This is easy. Now you can even measure the lowest imaginable concentrations, but what do you do with it? If you don't know for sure whether the substance is dangerous, and if you don't have an economic alternative, this type of measures will lead nowhere. One has to remain alert, but not spread panic...People reach the age of 80 to 90 years now. So our life is apparently not so unhealthy."

Professor Donald R.A. Uges, University Hospital of Groningen, the Netherlands. "Ons bloed zit vol gif, maar geen zorgen," Trouw, 17 November 2004, Pg. 3

### **Presence of a chemical in a person's blood does not mean it causes a disease**

"The measurement of an environmental chemical in a person's blood or urine does not by itself mean that the chemical causes disease."

*US Department of Health and Human Services, Centers for Disease Control and Prevention*

### **WWF-Greenpeace engage in scaremongering**

"These compounds can cause diseases but not at the levels found in these tests (WWF-Greenpeace report – A Present for Life) ... Most chemicals were found at a fraction of a part per billion. There is no evidence such concentrations pose any threat to people's health. This is irresponsible, hysterical scaremongering."

Professor Alan Boobis, Imperial College London. "Poison experts attack 'hysteria' over chemicals," *The Observer*, 18 September 2005



### Presence of Chemicals Should Not Set Off Alarms

"PBDE levels in the environment have been rising and virtually all of us have some of these chemicals in our body. There may be as much as 0.5 micrograms per litre in an individual's blood plasma. What does this mean? For one, it means that chemists have developed amazing abilities to determine tiny concentrations. We are talking about finding the proverbial needle in the haystack. What, though, does it say about any health risk? Without any further information, not much."

Joe Schwarcz, PhD. "The Search for Safe," *National Post*, 13 June 2006

### Banning Flame Retardants Would Create Unnecessary Risk

"As a sensible environmentalist, I believe banning flame retardants would put the most vulnerable at risk needlessly -- young children and the elderly -- when there is simply no evidence of human harm. Precaution dictates we err on the side of proven fire safety."

Dr. Patrick Moore, co-founder of Greenpeace and chairman and chief scientist of Greenspirit Strategies Ltd. "Douse plan to ban flame retardants," *Seattle Post-Intelligencer*, 24 February 2006

### The cardinal rule of toxicology: "The dose is the poison"

"The traces of fire retardants (targeted by the WWF in its recent campaign) on my furniture and my television at least proves that these chemicals are doing their job -- protecting me. But WWF fails to provide the necessary information for the public to make a balanced judgement. Worse, a cardinal rule of toxicology is ignored: All chemicals are hazardous, depending on the dose."

Professor Anthony Trewavas, "Chemical Warfare," *The Wall Street Journal*, 2 November 2005



1110 Vermont Ave., NW  
Suite 1200  
Washington, DC 20005  
T: 202.530.4847 • F: 202.530.4500

## FLAME RETARDANTS AND FIRE SAFETY

### MYTH vs. FACT

- MYTH:** The flame retardant Decabromodiphenyl ether (Deca-BDE) is not well known or understood.
- FACT:** **Deca-BDE is the most studied flame retardant in history** and, after an exhaustive 10-year analysis by the European Union, was found to be **safe for continued use**. The US EPA, the National Academy of Sciences and others have reached similar conclusions.
- MYTH:** "Safer" alternatives to Deca-BDE are readily available.
- FACT:** In its areas of application, **Deca-BDE is the most effective flame retardant available**. **None of the alternatives commonly cited have undergone the same rigorous scrutiny** regarding potential human health and environmental impacts. **Deca-BDE is a safe, efficient and effective life-saving flame retardant with significant scientific evidence supporting its continued use.**
- MYTH:** Computer manufacturers are leading the way to Deca-BDE alternatives.
- FACT:** The major use of Deca-BDE is in the plastic housings of television sets and insulation in wiring. Computer manufacturers are not, nor have they been, major users of Deca-BDE.
- MYTH:** Several states are taking action against Deca-BDE, and Maine is scheduled to ban Deca-BDE in 2008.
- FACT:** **No state has taken action against Deca-BDE.** Some states have enacted prohibitions against Penta- and Octa-BDE, two other brominated flame retardants that are no longer produced.
- In Maine, Deca-BDE remains an acceptable flame retardant. If a nationally available, effective alternative to Deca-BDE is found, new legislation would be required to change this status.
- MYTH:** The European Commission restricted use of Deca-BDE under its Restriction of the Use of Certain Hazardous Substances (RoHS) directive in electrical and electronic equipment.
- FACT:** Deca-BDE was originally included in RoHS, pending completion of a major, on-going risk assessment. That risk assessment found Deca-BDE safe for continued use and, as a result, the **European Commission exempted all polymeric applications of Deca-BDE from the RoHS Directive**. **The use of Deca-BDE is not restricted.**
- MYTH:** Montana can ban Deca-BDE without affecting fire safety.
- FACT:** The benefits of Deca-BDE as an effective flame retardant are well documented, and **its use is credited with saving thousands of lives**. **The National Association of State Fire Marshals and the National Fallen Firefighters Foundation have noted the fire safety benefits of Deca-BDE.** If Montana bans Deca-BDE, many products may either not be available in Montana, or be available without flame retardants, thus decreasing fire safety.

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1801 K Street, NW  
Suite 1000-L  
Washington, DC 20006  
T: 202.530.4847 • F: 202.530.4500

### **Deca-BDE and Alternative Flame Retardants**

Decabromodiphenyl ether (Deca-BDE) is a brominated flame retardant used in a variety of consumer electronic and electrical applications, including television housings and wire and cable insulation, because of its compatibility with those materials and its effectiveness in preventing fires.

Deca-BDE is the most studied flame retardant on the market, having been the subject of an extensive 10-year evaluation by the European Union, as well as other major studies performed by the US EPA and the US National Academy of Sciences, and has been found to present no significant risks to humans or the environment. This conclusion resulted in the European Commission's exemption of Deca-BDE from its Regulation of Hazardous Substances Directive (RoHS) in October 2005.

In its areas of application, Deca-BDE is the most effective flame retardant available. There are no potential alternatives that combine Deca-BDE's technical efficiency with such rigorous evaluation of potential environmental and human health impacts. Requiring the replacement of Deca-BDE, a product with no identified risks to human health or the environment, with other flame retardants whose potential impacts on human health and the environment are far less understood is not sound public policy.

#### **FACT: Deca is the best fire safety option available today for its specific applications.**

- Deca-BDE is well-suited to the applications for which it is most commonly used – plastic housings of TVs and other electrical equipment, electrical connectors, wire and cable covering, automobile and airplane components, and textile backcoating – providing excellent ignition resistance and flame retardant capabilities.
  - In particular, only bromine- or chlorine-containing flame retardants can provide the level ignition resistance needed in many electronic applications involving high impact polystyrene plastics.
- In its applications, Deca-BDE does not affect the material properties of the plastics in which it is used.
- Deca-BDE is highly efficient, requiring a relatively low volume of material to provide high levels of ignition resistance. Alternative flame retardants can require higher volumes of the selected flame retardant to be used.
- Deca-BDE is available on a commercial scale at a reasonable cost.

#### **FACT: No other flame retardant has been as widely tested and analyzed.**

- Deca-BDE has been rigorously tested in the US and Europe and found to be safe for use from environmental and human health perspectives.
- EU Risk Assessment: A 10-year-long Risk Assessment was completed in May 2004 and additional studies were reviewed through August 2005. That risk assessment evaluated more than 580 studies and concluded, "there is at present no need to reduce the risks for consumers beyond those which are being applied already."
- U.S. National Academy of Sciences: "Based on existing review of toxicity and use information, and the subcommittee's conservative exposure assumptions, the subcommittee concludes that no further research is needed for assessing health risks from [Deca-BDE]."<sup>1</sup>
- The US Consumer Product Safety Commission "assessed the potential risks associated with the use of Deca-BDE in upholstery cover fabrics and in mattress barriers, and concluded that those applications would not present a health hazard to consumers."<sup>2</sup>
- The full life cycle of the Deca-BDE product has been evaluated, from initial production through recycling at the end of consumer product life.
  - A voluntary emissions reduction program is in place in Europe, and will soon be in place in North America, to reduce emissions at the production and manufacturing stages.
  - Alternative flame retardants have not undergone a similar level of analysis and may cause unintended human health and environmental consequences.

<sup>1</sup> National Research Council, *Toxicological Risks of Selected Flame-Retardant Chemicals*, National Academy Press, ISBN 0-309-07047-3, 2000

<sup>2</sup> Fiscal Year 2006 Commission Briefing Packages, Briefing Package: Status Update on Regulatory Options for Upholstered Furniture Flammability (4014), Main Package, January, 2006 (44 pages), page 31



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Suite 1000-L  
Washington, DC 20006  
T: 202.530.4847 • F: 202.530.4500

## **Fire Statistics**

Flame retardants play a critical role in making homes, apartments, hospitals, nursing homes, offices, cars and public transportation safer from the life-threatening consequences of fire.

Despite advances in fire safety, technology and building codes, fires still represent a very serious risk, and the United States has the third highest overall fire death rate of all industrialized countries.<sup>1</sup>

### **2005 Fire Statistics<sup>2</sup>:**

- Fire departments responded to 1,602,000 fires
- Firefighters killed in the line of duty – 87
- Civilians killed – 3,675
- Civilians injured – 17,925
- Direct property loss – \$10.6 billion
- Structural fires – 511,000 fires with 3,105 civilian fire deaths and 15,325 civilian fire injuries
- Vehicle fires – 290,000 fires with 520 civilian fire deaths and 1,650 civilian fire injuries

### **What this means on a daily basis:**

- Every 20 seconds a fire department responded to a fire
- A fire fighter died in the line of duty every fourth day
- Ten civilians died each day from fire
- 50 civilians were injured each day from fire
- Daily property loss – \$29 Million
- Nearly 800 vehicle fires per day claiming on average more than one life per day

<sup>1</sup> CDC Injury Center, CDC's Unintentional Injury Prevention Program, Activity Report 2001

<sup>2</sup> Fire Loss in the United States During 2004, Michael J. Karter, Jr.



1110 Vermont Ave., NW  
Suite 1200  
Washington, DC 20005  
T: 202.530.4847 • F: 202.530.4500

## The Facts on Deca-BDE and Degradation

The flame retardant Decabromodiphenyl ether (Deca-BDE) is the most studied flame retardant in history. An exhaustive 10-year analysis by the European Union found Deca-BDE safe for continued use. Other major studies performed by the U.S. National Academy of Sciences, the U.S. Consumer Products Commission and the United Kingdom's Department of Trade and Industry have reached similar conclusions.

Some groups are claiming that use of this safe, effective, life-saving flame retardant should be discontinued because of its potential to degrade and contribute to lower brominated diphenyl ethers being found in the environment. In fact, substantial scientific evidence shows that Deca-BDE is not a significant source of these substances.

**FACT: Deca-BDE does not degrade significantly under natural conditions**

Under artificial laboratory conditions Deca-BDE has been found to undergo degradation. Most of these studies are trying to maximize potential degradation reactions and using extreme and artificial factors that do not reflect environmentally relevant conditions, consequently limiting the significance of the studies.

**FACT: The substances found in the environment do not match the congeners artificially formed in the laboratory by Deca-BDE**

The PBDE (polybrominated diphenyl ether) substances formed in these laboratory experiments are different and do not match what is typically found in the environment. Were these processes relevant, the PBDEs found in the environment would correspond to those that are found in laboratory experiments on Deca-BDE degradation. This is not the case.

**FACT: This matter has been reviewed by an extensive EU scientific assessment which concludes that this is not an issue**

Questions over the potential degradation of Deca-BDE have been extensively reviewed and discussed at the European Risk Assessment of Deca-BDE under the EU Existing Substances Regulation 792/93/EEC. The EU risk assessment report concludes on that subject that, "although it appears possible for reductive debromination to occur, the amounts of the lower brominated diphenyl ethers formed will be very small."

Laboratory studies claiming degradation of Deca-BDE with specially cultivated bacteria, in sewage sludge, with chemical reducing agents, or via photolysis all share common features: They do not reflect real environmental conditions and they do not observe Deca-BDE degrading into the PBDEs found in the environment. By contrast, a recent environmentally-relevant field study by Sellström et al<sup>1</sup> from Stockholm University examined potential photolysis of Deca-BDE in soil that had been amended with Deca-containing sewage sludge over several years. The study did not find any indication of photolysis/degradation of Deca-BDE even under extreme conditions. The authors noted that, "The results with soils collected in the field show the importance of following up laboratory studies with field studies."

Further study of Deca-BDE, including its potential for degradation in the environment, is ongoing. The potential for Deca-BDE to degrade in the environment is further addressed within an environmental monitoring program currently being conducted under direction from the European Union.

<sup>1</sup> "Effect of Sewage-Sludge Application on Concentrations of Higher-Brominated Diphenyl Ethers in Soils and Earthworms" Sellström, U; de Wit, C.A.; Lundgren, N.; Tyskline, M., Environ. Sci. Technol.; **39(23)** (2005); 9064-9070



1801 K Street, NW  
Suite 1000-L  
Washington, DC 20006  
T: 202.530.4847 • F: 202.530.4500

## **Flame Retardants and Fire Safety: Deca-BDE**

Flame retardants play a critical role in making homes, apartments, hospitals, nursing homes, offices, cars and public transportation safer from the life-threatening consequences of fire.

Despite advances in fire safety, technology and building codes, fires still represent a very serious risk, and the United States has the third highest overall fire death rate of all industrialized countries.<sup>1</sup> The Home Safety Council reports that fires and burns are the third leading cause of home-injury deaths, accounting for an average of 3,400 deaths per year from 1992 - 1999. Of all fire and burn-related injuries, 90 percent of all fatalities and 57 percent of non-fatal injuries occur in the home.<sup>2</sup>

The very young, the elderly, and the economically disadvantaged are at particularly high risk. For example, the risk to children and those over age 65 of dying in a fire is twice the average for a U.S. adult. Individuals who are 85 and older have a risk that is almost 4.5 times the national average.

### **The role of flame retardants in fire safety**

Flame retardants, or ignition resistance materials, help prevent fires from starting and slow the rate of growth of fires that do start. They are widely used in electronics, electrical appliances, furniture, fabrics and all forms of public transportation. As such, flame retardants allow longer escape times for those in the presence of a fire, as well as longer response times and less advanced fires for firefighters. It is estimated that escape times can be up to 15 times longer when flame retardants are present, providing increased survival chances for those in close proximity. A recent study by the University of Surrey estimates that flame retardants have been responsible for a 20 percent reduction in fire deaths in the United Kingdom in recent years.<sup>3</sup>

When flame retardants are not present, as was the case in the tragic 2003 Rhode Island Station nightclub fire in which 100 people died during a fire involving foam insulation that was not flame-retarded, rapid ignition and fire spread can lead to significant loss of life and property. Conversely, when an Air France jet skidded off the runway in Toronto in 2005 and burst into flames, the flame retardant materials used in airplane construction were credited with providing the extended escape time needed for all 309 passengers and crew to escape.<sup>4</sup>

### **Deca-BDE and fire safety**

Decabromodiphenyl ether (Deca-BDE) is a brominated flame retardant used in a variety of consumer electronic and electrical appliances, including television housings and wire and cable insulation, as well as in some textiles, because of its compatibility with those materials and its effectiveness in preventing fires.

Deca-BDE is a white crystalline powder that is mixed into raw plastics to form a consistent, flame-retarded material. This flame-retarded plastic is then used in the manufacture of flame retardant plastic components, such as television set housings, wire and cable insulation, electrical connectors, etc. In textile applications, Deca-BDE is typically used in a water-based system which is customized for the textile being treated. After the water-based product has been applied, the textile goes through a drying process, during which Deca-BDE is physically locked into a "polymer matrix" and bound to the textile.

Deca-BDE is the most studied flame retardant on the market, having been the subject of an extensive 10-year evaluation by the European Union, as well as other major studies performed by the US EPA and the US National Academy of Sciences, and has been found to present no significant risks to humans or the environment. In its areas of application, Deca-BDE is the most effective flame retardant available and potential alternatives have not undergone the same rigorous scrutiny regarding potential human health and environmental impacts.

<sup>1</sup> CDC Injury Center, *CDC's Unintentional Injury Prevention Program, Activity Report 2001*

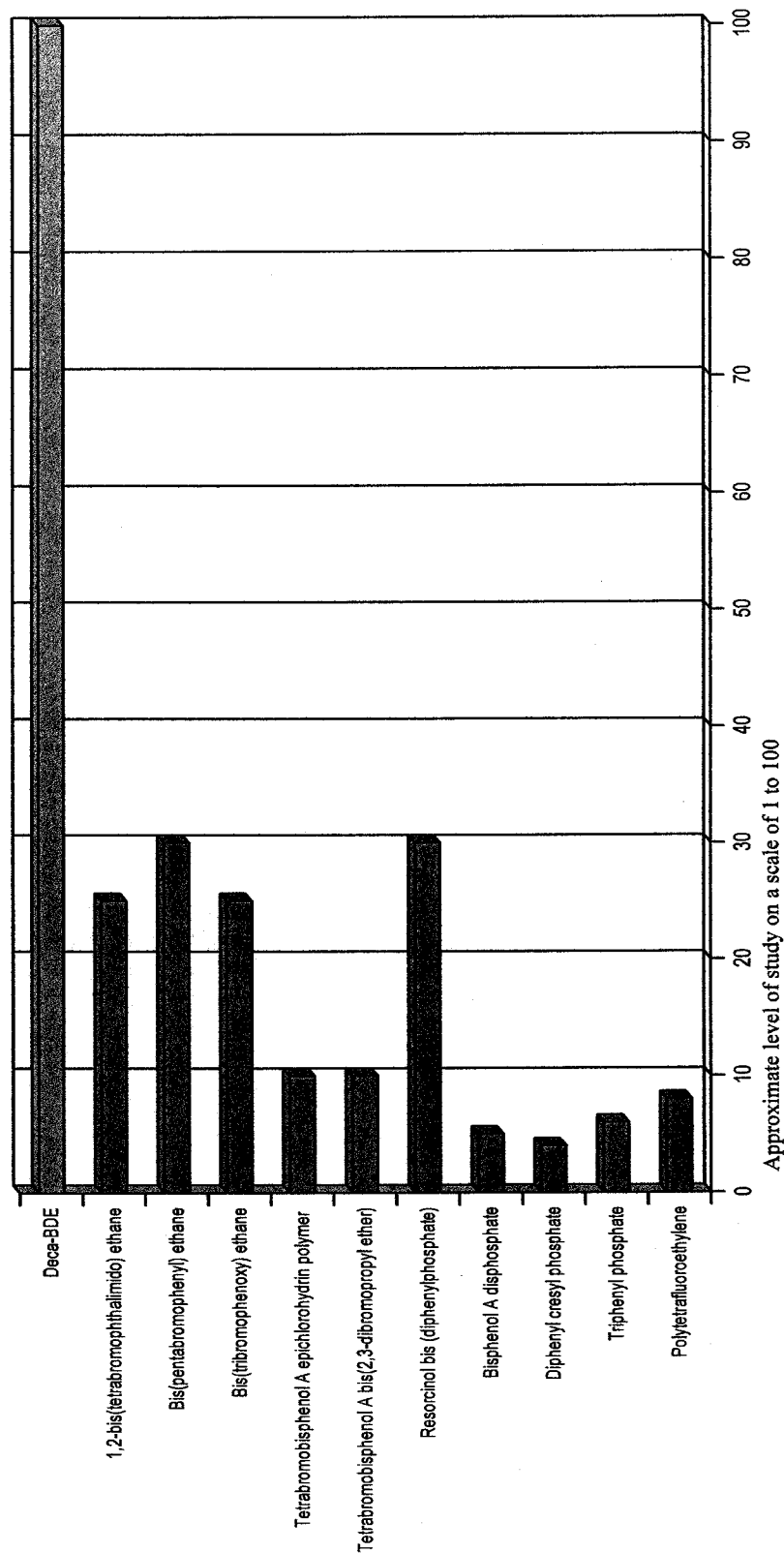
<sup>2</sup> Home Safety Council, *The State of Home Safety in American: Facts About Unintentional Injuries in the Home, Second Edition 2004*

<sup>3</sup> University of Surrey Polymer Research Centre Report, *International Fire Statistics and the Potential Benefits of Fire Counter-Measures, May 2005*

<sup>4</sup> *The Washington Post*, August 5, 2005 at D1

# Alternative Flame Retardants: A Comparison of Scientific Analyses

In its areas of application, Deca-BDE is the most effective flame retardant available. Potential alternatives have not undergone the same rigorous scrutiny regarding potential human health and environmental impacts. Deca-BDE is a safe, efficient and effective life-saving flame retardant with many years of scientific evidence supporting its continued use. This chart lists the "alternatives" identified by the Washington Departments of Ecology and Health, and their respective levels of testing, as compared to Deca-BDE.



\* Tetrabromobisphenol A, Hexabromocyclododecane, Zinc Borate and Antimony were also listed as "alternatives" to Deca-BDE but, in fact, Tetrabromobisphenol A and Hexabromocyclododecane have limited use as an alternative to Deca-BDE and are not suitable for application in the broad range of products in which Deca-BDE is used. Zinc Borate and Antimony Trioxide are synergists for halogenated systems, not flame retardants in and of themselves.

October 2006

# Deca-BDE Flame Retardant

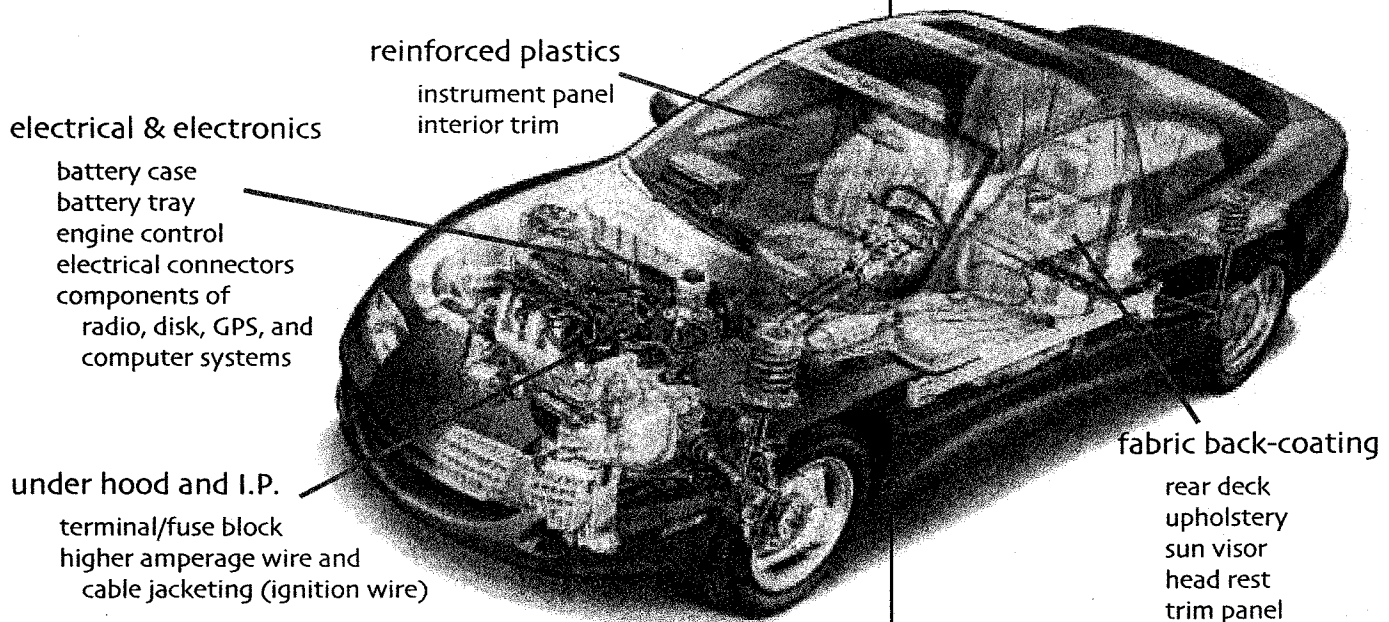
## Automotive Facts

Flame retardants, or ignition-resistant materials, help to prevent fires from starting and slow the rate of growth of fires that do start. Many automotive components are mandated to achieve a given level of flame retardancy per FMVSS#302, and the OEM material specifications incorporate these requirements.

Deca-BDE (decabromodiphenyl ether) is a brominated flame retardant used in a variety of applications because of its compatibility with component materials and its effectiveness in preventing fires. Deca-BDE is the best fire retardant available for a wide array of automobile components.

Commercial Deca-BDE is the most studied flame retardant on the market and has been found to present no significant risks to humans or the environment. The full life cycle of the Deca-BDE product has been evaluated, from initial production through recycling at the end of consumer product life, and Deca-BDE has been deemed safe for continued use.

## Possible Locations of Deca-BDE in Vehicles



Despite advancements in fire safety, vehicle fires still represent a very serious risk.

- In 2004 alone, there were 297,000 vehicle fires in the United States.\*
- 550 deaths resulted from vehicle fires in the United States in 2004.\*
- Property damage from vehicle fires in the United States totaled approximately \$1,304,000,000 in 2004.\*

\*National Fire Protection Association, 2005 ([www.nfpa.org](http://www.nfpa.org))



***In its areas of application, Deca-BDE is the most effective flame retardant available.***

- Deca-BDE is highly efficient compared to other flame retardants, requiring relatively low usage levels to provide a high degree of ignition resistance.
- Deca-BDE is encapsulated within the plastic automotive parts in which it is used.
- The impact of Deca-BDE on the physical properties of the parts is much less than that of other flame retardants.

### ***Legislative Status***

*There are no laws or regulations anywhere in the world that ban or restrict the commercial use of Deca-BDE.*



A ten-year-long risk assessment of all Deca-BDE's potential environmental and human health impacts carried out by the European Union government chemical authorities was closed in May 2004. It concluded that there were no identifiable risks and no restrictions on use of Deca-BDE. That conclusion led directly to the European Commission's exemption of Deca-BDE from the Restrictions on Hazardous Substances Used in Electrical and Electronic Applications (ROHS) Directive on October 15, 2005.

Other independent studies confirm these results and include:

- U.S. National Academy of Sciences Review of DBDPO (Deca-BDE)
- Consumer Product Safety Commission DBDPO Risk Assessments
- U.K. Department of Trade and Industry: Risks and Benefits in the Use of Flame Retardants
- Japan's Risk Assessment of Deca-BDE
- California Senate Office of Research report on PBDEs

### Product Stewardship

BSEF has established a Voluntary Emissions Control Action Program (VECAP). Under VECAP, BSEF works closely with manufacturers and other end users of Deca-BDE to ensure they are employing "best practices" in the handling and use of Deca-BDE in their facilities and processes. The VECAP program is achieving significant results in Europe, and similar results are anticipated in North America.

## Automotive Areas Vulnerable to Fire

### interior

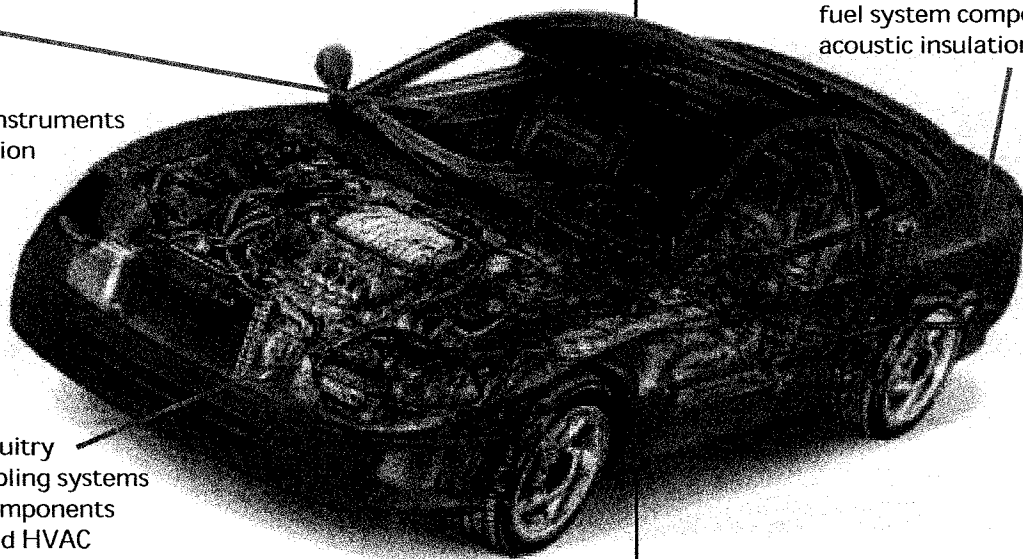
seats  
panels and trim  
crash pad and instruments  
acoustic insulation  
adhesives

### exterior

plastic body panels  
fuel system components  
acoustic insulation

### under hood

ignition circuitry  
wire and cabling systems  
electrical components  
air filters and HVAC



Other polybrominated diphenyl ethers (PBDEs), in particular pentabromodiphenyl ether (Penta-BDE) and octabromodiphenyl ether (Octa-BDE) and articles containing them have been prohibited in some states. Manufacturers voluntarily ceased production of these compounds as of December 2004. It is important to understand that, despite the tendency to group all PBDEs together and refer to them as a single chemical, Deca-BDE is, in fact, a chemically and structurally distinct chemical.

*Prepared by the Bromine Science and Environmental Forum with assistance from the SAE Substance of Concern Committee of the USCAR Vehicle Recycling Partnership*

**Exhibit Number:** 12

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BSEF Document Library Continued  
February 15, 2007

EXHIBIT 12  
DATE 2-16-97  
NO 56

### Table of Contents:

#### A. Recent Scientific News on Deca-BDE November 2006

##### Studies:

1. US study finds Deca-BDE acceptable for use as flame retardant in mattresses – January 2006
2. UK Food Safety Authority study states that the presence of some BFRs in fish is unlikely to represent a health risk – February 2006
3. University of Utrecht's IRAS study confirms PBDEs do not have PCBs-like effects – March 2006
4. Danish EPA survey on the migration and health evaluation of chemical substances confirms brominated flame retardants not identified in toys – March 2006
5. NGO sponsored study indicates low potential for debromination of Deca-BDE in the environment– May 2006
6. First Annual Progress Report for industry's Voluntary Emissions Control Action Program (VECAP) indicates significant emission reduction – May 2006
7. Berkeley University microbial debromination study confirms existing research – June 2006
8. UK FSA survey indicates no implication for health from PBDE and HBCD in the diet – June 2006
9. Swedish SP Institute research shows that Deca-BDE saves life and money – June 2006
10. Maryland Report – December 2006



1110 Vermont Ave., NW  
Suite 1200  
Washington, DC 20005  
T: 202.530.4847 • F: 202.530.4500

February 16, 2007

Dear Firefighter,

Some in the environmental and health community are alleging that Deca-BDE poses health risks to firefighters when fighting fires. This is simply not true – the presence of flame retardants in general, and Deca specifically, in materials that may be involved in a fire do not pose additional risks to firefighters by contributing to potentially dangerous combustion products or gases. In fact, flame retardants such as Deca help firefighters by providing increased escape times for those faced with a fire, and increased time until flashover for those fighting a fire.

According to U.S. National Bureau of Standards testing, total quantities of toxic gases produced in a room fire test, express in CO equivalents, were reduced by two-thirds by the use of flame retarded products. Simply put, by reducing the severity of fires that do occur, flame retardants help reduce levels of combustion by-products. As you and your fellow firefighters well know, the real risks to firefighters come from the fire itself and from smoke containing toxic byproducts, principally carbon monoxide and cancer-causing polyaromatic hydrocarbons, and certainly not from the small amounts of brominated flame retardants that may be present in materials that are involved in a fire. As noted previously, flame retardants help firefighters by reducing the number of fires that occur, slowing the spread of those fires that do occur and providing increased escape times – perhaps as much as 15 times longer, according to one study.

Enclosed are several studies (sections 3-6) that demonstrate Deca's sound scientific record. I encourage you to review them, but the bottom line is that flame retardants do not pose any increased risk for firefighters by increasing the toxicity of combustion gases during either the fire or overhaul.

Deca is the most-studied flame retardant in history. In 2004, the European Union completed a 10-year-long Risk Assessment of Deca, examining a broad range of human health and environmental issues addressed in more than 580 studies, and did not identify any human health or environmental risks in need of further regulation. Other major reviews performed by the U.S. National Academy of Sciences, the U.S. Consumer Products Commission and others have reached similar conclusions. As a direct result of the EU Risk Assessment, the European Union on October 15, 2005, exempted Deca from its Restrictions on Hazardous Substances (RoHS) Directive.

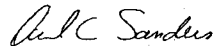
None of the "alternative" flame retardants that might replace Deca have been as intensely studied and tested. The potential human health and environmental repercussions of requiring manufacturers and other users of Deca to abandon a very well-known substance that has been established as safe for continued use in favor of unidentified or lesser-known substances are, at best, unknown.

Deca is the primary flame retardant used in many plastics in the U.S., in particular in the plastics used in televisions, as well as in textile, automotive and building applications. Given Deca's proven efficiency and effectiveness in preventing or lessening the impact of fires, as well as the significant scientific evidence supporting its continued use, we believe that calling for a ban is misguided, and would actually result in a decrease in fire safety.

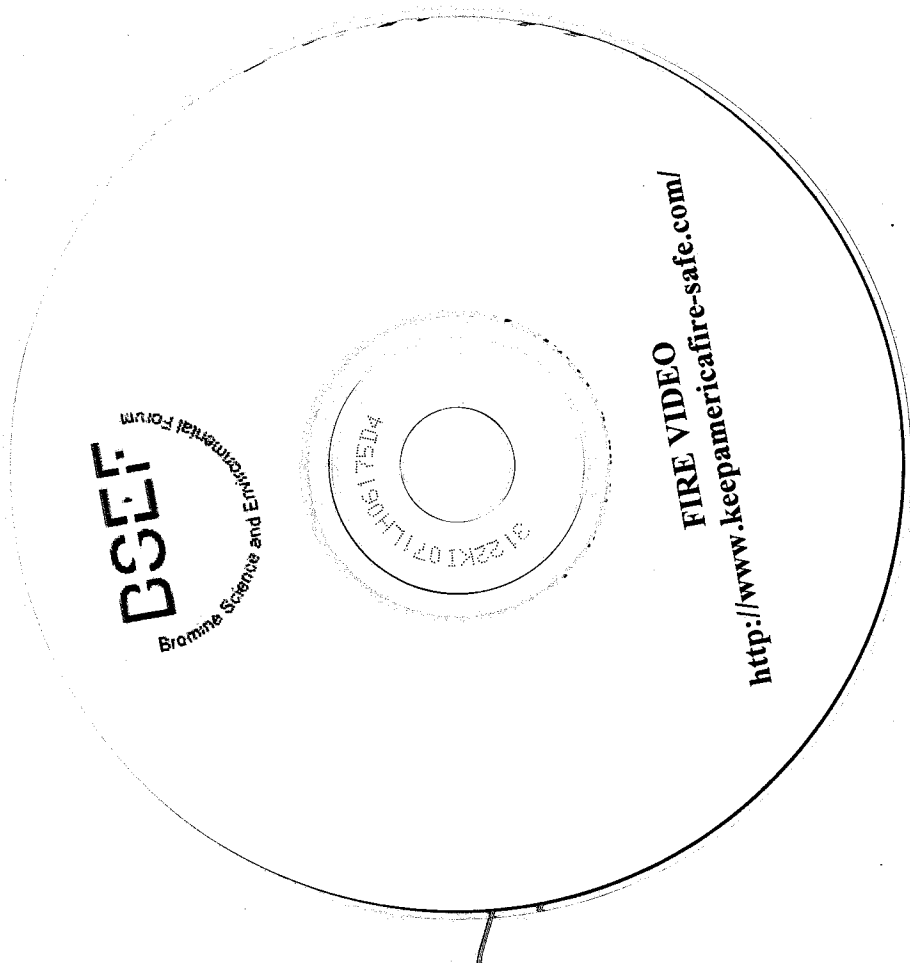
Finally, the National Association of State Fire Marshals opposes legislation that would ban Deca without scientific justification, as articulated in their March 2004 memorandum to state legislators. If anything, the science supporting Deca has grown even stronger since that time, including completion of the EU Risk Assessment and the subsequent exemption of Deca from the EU's RoHS Directive.

The bottom line is that the fire-preventive benefits of Deca far outweigh any potential risks associated with its use, and we strongly urge you to consider this information before forming an opinion on the legislative and public policy debate taking place in Illinois over flame retardants in general and Deca in particular.

Sincerely,

A handwritten signature in cursive script, appearing to read "David C. Sanders".

David C. Sanders, Ph.D.  
Member of the Management Committee, BSEF



2 DVD